Petr Stepanov

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> Ph.D. graduate in physics with a focus in GUI desktop software development for data analyses. More than 5 years in website and web application development. Strong user interface (UI) and user experience (UX) design skills.

Summary of Qualifications

- Application of the Machine Learning (AI) for classification of the experimental data.
- Strong Object Oriented Programming (OOP) skills. Debugging and bug fixing code in modern IDEs.
- Delivering production ready software written in compiled languages (C++, CMake, GNU Makefiles).
- BASH scripting on High-Performance Computing (HPC) Linux environment.
- 5+ years of user interface programming (UI) with Model-View patterns (MVC, MVP). State-oriented programming.
- 3+ years in building responsive web apps with modular JavaScript, HTML, and CSS.
- 6+ years of UI and UX wireframing and interactive prototyping for web and mobile applications (Figma, Sketch).

Work Experience

C++ Software Developer

Thomas Jefferson National Laboratory (JLab), Newport News, VA. *Jul 2020 - Jan 2023*

- Coded a Geant4-based simulation for studying the optimal light guide length (range 0-10 cm) for the EM calorimeter used in the Electron-Ion-Collider (EIC) project. Link to GitHub.
- Used Machine Learning (ML) techniques to perform binary classification of thousands of signals from a data acquisition (DAQ) setup. Link to GitHub.
- Applied CERN ROOT framework (C++) to perform statistical analysis of a significant amount (over 100 GB) of the raw experimental data of the Kaon LT experiment at JLab. Link to GitHub.
- Utilized SLURM functionality on the High-Performance Computing (HPC) environment to execute a series of simulations in parallel. This reduced the wall time by more than 10 times.
- Set up data acquisition system that performs triggered waveform acquisition involving 3 devices - Tektronix oscilloscope, Network Attached Storage, and RedHat computer (SAMBA, Python, National Instruments NI-VISA library).
- Contributed 100+ shifts at Hall C at the Thomas Jefferson Particle Accelerator facility for the Pion LT project.

Software Developer • Postdoctoral Researcher

Catholic University of America (CUA), Washington, DC. *Jul 2020 - Jan 2023*

- Programmed a Geant-4 computer simulation (C++, CMake, Eclipse IDE, gdb) to study the performance of a novel scintillation material for EIC, Brookhaven National Lab. Link to GitHub.
- Visualized energy deposition profiles and calculated energy resolutions for a variety of detector assemblies.
- Teaching experience. Mentoring students within a 3-month Research Experiences for Undergraduates (REU) program at the Physics Department at CUA.
- Enhanced debugging of the CERN library source code led to the publishing of more than 10 bug reports on the ROOT (C++) forum.

Software Developer • Research Assistant

Bowling Green State University (BGSU), Bowling Green, OH. *Aug 2014 - May 2020*

- Assembled positron lifetime and Doppler spectrometers from ORTEC and Canberra (Mirion) fast electronic units. Utilized High-Purity Germanium Detectors (HPGe) and scintillation-based detector systems for single-photon counting.
- Developed three open-source programs (C++, CERN ROOT) for a novel interpretation of the positron lifetime and Doppler experimental spectra.
  - Derived and solved kinetic equations describing the formation and chemical reactions of e+ and Ps atoms in solids, liquids, and nano-powders (Wolfram Mathematica).
  - Incorporated physical parameters (grain size, defect concentrations, rate constants) into custom models (PDFs with convolution) for fitting the experimental spectra (RooFit).

- The above research allowed for the estimation of defect concentrations and sizes in solids, classification of defect types (vacancies, dislocations), and characterization of the chemical decoration of defects.
- Wrote three desktop GUI programs for spectra fitting and interpretation (C++, CMake, ROOT, Qt, Java)
  - GitHub repositories contain over 10k lines of code in total: TLIST Processor, SW Calculator, RooPositron.
  - Extended default ROOT GUI library (Qt-based) to support the MVP design pattern.
- Wrote a GUI application LuminApp (Java, Swing) to parse and merge time-stamped data from optical spectrometer and thermometer. This increased data processing time by two orders of magnitude.
- Developed static website (Hexo, Gulp, Bootstrap) and visual identity for the SelimLab research group. The website has a 99% Google performance rank and features 700 ms time to interactive metrics.
- Maintained local Apache HTTP server physics.bgsu.edu hosting over 10 websites at the BGSU.
- Created website for the ICPA-18 international conference with registration (over 150 users) and payment system workflow (WordPress, PHP, Recurly.js), and landing pages for events.

Frontend Developer, UI/UX Designer • Freelance *Sep 2012 - May 2020*

- Designed and built an online e-commerce store Sticker Store LLC with a static website generator (Figma, Hexo, Snipcart, Bootstrap, SASS, Express.JS, EJS, Node.js).
  - Improved the Google PageSpeed Insights metrics (CLS, LCP) up to 97%.
  - Created a recursive script to export over 300 products from YAML file to Google Merchant.
  - Optimized SEO. The project reached over 1400 organic monthly users.
- Made iOS application (Swift, UIkit, storyboards) for the We.Team messenger (more than 3k monthly downloads in AppStore). Participated in cloud-based messenger development with enhanced file sharing capabilities (HTML, React JS, SASS).
- Migrated the landing page for Sweetbridge company from WordPress to Jekyll static site generator (Ruby, CSS). This resulted in a 70% improvement in the page load time.
- Developed the front-end part (Angular.js, HTML, LESS) for Lili Social network.
  - Assisted with iOS mobile application (Ionic).
  - Enabled SEO crawling of over 1000 Angular.js pages with Google bot.
- Web design.
  - Designed logos, UI/UX prototypes (Figma, Sketch, Illustrator) and branding identity for over 10 different companies.
  - Converted numerous design assets and mockups into responsive HTML and CSS.
  - Mocked up and integrated dozens of cross-browser responsive email templates.

Education

Bowling Green State University (BGSU) • OH, United States *Aug 2014 - May 2020*

Ph.D. in Photochemical Sciences • GPA 3.423. Dissertation: Novel developments in positron spectroscopy (PAS).

British Higher School of Art and Design (BHSAD) • Moscow, Russia *Dec 2011 - Feb 2012*

Three-month intensive in Graphical Design and Visual Communications (illustration, lettering, brand identity).

National Research Nuclear University (MEPhI) • Moscow, Russia *Sep 2004 - Feb 2011*

B.S. and M.S. in Solid State Physics. Thesis: application of PAS for defect concentration studies in bulk materials.

Professional Networks

- Find examples of my code on GitHub (50+ repositories).
- Discover my professional contacts on LinkedIn (200+ connections).
- Check out my UI and UX design portfolio on Dribbble (50+ shots).

Relevent Interests

- Hosting an open-source project for keyboard remapping on Linux 300+ stars on GitHub.
- Developed a RAMDisk plugin for Linux that provides 50% increase in source code indexing time.
- Created two shared libraries for the ROOT data analysis framework [1, 2].

- Right to repair follower. Collecting and repairing old phones and laptops.
- Worked as mechanic and fabricator at a non-profit automotive shop (part-time, Oregon City, OR).